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Applicant (Actual Inventor). Alexander Michael Uvchen.

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Drawing attached.

COMPLETE SPECIFICATION.

**BALL CASTER OR THE LIKE AS SUBSTITUTE FOR ROLLER CASTERS, SWIVELLED WHEELS
AND THE LIKE.**

I, Alexander Michael Uvchen, of 43 Cathcart Street, Fairfield, N. S. W. an engineer, hereby declare this invention, and the manner in which it is to be performed, to be fully described and ascertained in and by the following statement.

This invention relates to casters, swivelled wheels and the like, and has for its object so constructing such casters as to have two skew axes of rotation one, vertical, passing through a caster's pivot and the other, horizontal, passing through the axles of a roller or wheel, usually involved in constructions of self-swivelling casters, replaced by a single point of rotation.

The present invention presents a substitute for roller casters, swivelled wheels, and the like - in which the function of a roller or wheel is performed by a ball hereinafter referred to as "rolling ball", and the function of the roller's or wheel's axle is executed by a number of balls hereinafter referred to as "bearing balls" - and comprises essentially a rolling ball adapted to roll on a surface of support, such as a floor for instance; a plurality of bearing balls, smaller in diameter than the said rolling ball, distributed on its surface; and a casing adapted to envelop the said rolling ball, barring a portion of it, and bearing balls holding the former and the latter so as to permit them to rotate freely around their centres while preserving the correlative positions of their centres with respect to each other as well as to the body of caster. To protect the encased parts of a caster from possible penetration of dirt, the said casing may be so constructed as to scrape off any dirt that may adhere to the said rolling ball when it rolls along a surface; or a scraper as a separate part may be added to the construction of a ball caster

In the accompanying drawing:-

C4. -LB3 - 115.

1.

Fig. 1 is a view in vertical section of a ball caster constructed according to this invention.

Fig. 2 is a view in horizontal section through two planes indicated by lines AA' & BB' on Fig. 1.

Fig. 3 is a view in vertical section of two modifications showing halves of each modification on either side of a line EF; the other halves, being their counterparts, are omitted.

Fig. 4 is a view in horizontal through GH of Fig. 3.

Fig. 5 shows a partly sectional and partly external view of a modification illustrating adaptation of a locking device or brake.

Fig. 6 is a view in section through IJ & KL of Fig. 5.

Fig. 7 is a view in vertical section of a simplified modification.

Throughout the views identical parts are marked with like reference characters.

Referring to Figs. 1 & 2, reference character 1 designates a rolling ball able to rotate in any direction around its centre when an object supported by the caster illustrated by Figs. 1 & 2 is moved in that direction. The rolling ball is situated in a bearing block 2 which presents upper, or rather inner, part of a casing. The interior of bearing block 2 is hollowed more or less in a semi-spherical form so as to accommodate the rolling ball 1. The said interior of bearing block has two rows of nest-like seats or cavities 5 & 6 into which bearing balls 7 & 8 are so fitted as to rotate around their centres freely while preventing contact between the rolling ball 1 and bearing block 2. The size of bearing balls may vary more or less independently from the size of rolling ball 1 as is suggested by dotted circumference 60, Fig. 1.

There may be more than two rows of seats with bearing balls. Or the seats and bearing balls may be placed in any position on the interior of the bearing block or casing, not necessarily in circular arrangement. To reduce friction, the seats for the bearing balls 7 may be made as separate parts from a graphite-metal composition or any other friction reducing or self-lubricating material and inserted into the bearing block 2 as indicated by a punctuated line 9, Fig. 1; or seats may be provided with self-lubricating pads 10, Fig. 1.

The bearing block 2 (or inner part of casing) (is firmly attached to a casing) (or external part of casing) (3 by any conventional means such as screw threads) (suggested by dotted lines 25, Fig. 1), or laps 12, Fig. 1, stamped out of the casings's body and bent inward, or other means. The said casing 3 is provided with an internal ridge 13, Fig. 1, so as to furnish a firm support for the bearing block at its bottom. The casing 3, at its lowest edge, is so shaped as to hold a scraping ring 4 and a coil spring 14. The scraping ring 4 (shown partly cut off on the left-hand side of Fig. 1 to permit an illustration of a modified part of casing) (has its internal edge 15, Fig. 1, beveled and well fitted to the surface of rolling ball 1, and is pressed against the latter by the coil spring 14. The spring is spreading more or less along the entire annular termination 16 of the casing 3, Fig. 1.

The outward form of the casing 3 may be of cylindrical, cuboidal, prismatic, or any other shape if a style of an object served by a caster demands it.

The upper part 18, Fig. 1, of the casing 3 is of a shape (such as cylindrical prismatic and the like) (adequate for fitting a caster on protruding part of an object, such as a leg of furniture for instance. Or the said upper part 18 of the casing 3 may be replaced by a flange or brackets as is indicated by dotted lines 20 & 21, Figs. 1 & 2 to suit flat-bottomed objects.

Casters are provided with some means of attachment to objects, such as screw holes

19, Figs. 1 & 2, or other adequate means.

The external casing 3, Fig. 1, may terminate at a circumference (indicated on Fig. 1 by a punctuated line 23) (sufficiently high above the bottom edge of the bearing block 2) (also referred to above as upper or inner casing) (as to provide enough space and means for rigid connection between the bearing block 2, which would actually become the upper part of casing, and the casing 3, which would become the lower part of casing terminating at 23, Fig. 1. The said rigid connection between the upper and the lower part of the casing may be effected, by such means as a screw thread, along the dotted lines 25, Fig. 1. The external form of the upper casing) (or modified bearing block 2) (may be of any desired shape, or it may coincide with external outlines of casing 3 above the line 23, Fig. 1, including part 18; or, to suit a flat object, the upper casing may be, instead of part 18, provided with a flange or brackets 22 as outlined by dotted lines.

External, or lower, casing may be so modified at its loest part as to form a scraper as well as to hold the rolling ball 1. To illustrate a modification of that type, the rolling ball 1, scraping ring 4, coil spring 14, and flange 16 are shown broken off in the left part of Fig. 1. The modification itself, indicated by reference character 17, Fig. 1, presents a part of external, or lower, casing extending below the ridge 13 and has a shape of a spherical belt or zone encompassing a part of rolling ball 1. Along its lowest part, the modified casing is provided with slits 24 of either straight or helical shape. The parts 26, separated by slits 24, are bent slightly inwards in order to exert light pressure upon the rolling ball 1 and to scrape it when it rotates.

Figs. 3 & 4 illustrate two modifications made, with the exception of rolling ball 1 and bearing balls 27 of Fig. 3, from sheets stamped and shaped to adequate forms. On Fig. 4 the rolling ball is not shown. The bearing block 28, Fig. 3, is shaped in the form of a semisphere and provided along its bottom edge as well as upon its main body with nest-like seats 29 in any number and position, not necessarily in two circular rows as is shown on Fig. 3, to accomodate the bearing balls 27. The said bearing block is fitted into an external casing 30 and is held in its position by a circular ridge 31 at the bottom and a plate or disc 32, Fig. 3 at the top. The disc or plate 32 is securely held in a groove 33 being tightly fitted into it. The plate or disc 32 may be affixed to the external casing by any other means. Or it may be enlarged and connected by any conventional means to flanged or bracketed casing as is indicated by punctuated lines 34, Fig. 3.

Two modifications illustrated by Figs. 3 & 4 differ essentially in the construction of scraping devices. In the modification of ball casters illustrated by parts of Figs. 3 & 4 to the left of plane EF, the bottom end of the external casing 30 is compressed into a scraping ring 35, Figs. 3 & 4, connected to the body of external casing by an annular corrugation 36. The said corrugation may be solid or, for greater elasticity, provided with slots 37, Fig. 4, uniformly distributed in radial or spiral directions around the scraping ring 35.

In the modification illustrated by the right-hand sides of Figs. 3 & 4, the introduction of a scraping ring 38, as a part separate from the external casing is shown. In this instance the bottom end of external casing 30 terminates with a plurality of tongues 39, Figs. 3 & 4, bent towards the scraping ring 38, Fig. 3, pressing the ring against the rolling ball 1, Fig. 3.

The types of scrapers described in connection with Figs. 1 & 2 can obviously replace as well as be replaced by those described in connection with Figs. 3 & 4, thus permitting an introduction of four additional variations of ball casters.

Figs. 5 & 6 illustrate application of locking device or "brake" to a ball caster.

The working parts of this type of ball casters, namely, rolling ball, bearing balls, and their-nest-like seats are constructed as described above in connection with Figs. 1, 2, & 3 and, therefore, are not shown here) (Figs. 5 & 6). (The lower casing 40, Figs. 5 & 6, is screwed on to the lower part of upper casing) (or bearing block) (41; and the screw threads on upper casing are indicated by 42, Fig. 5, where a part of lower casing is shown cut off to clarify construction. To prevent the lower casing from automatic unscrewing, a screw 44) (or several screws equally distributed around the upper casing) (or are) (inserted into the body of upper casing. To prevent the locking of rolling ball) (indicated by dotted line 1 on Fig. 5) (in its socket by a "brake" belt 43, Fig. 5, the part of lower casing, along its top edge and parallel to the threads 42, is cut off as shown by 45, Figs. 5 & 6, so as to provide space for the screw head 44 when the lower casing is screwed up by means of lugs or protuberances 46.

Figs. 5 & 6 show a construction with four lugs 46; but a ball caster may have any number of them of any shape convenient for such operations as pushing or striking by a shoe toe or hammer for instance.

The screw threads 42 and screws 44 may be replaced by two or more helical grooves or slots in the upper or lower casing) (indicated on Fig. 5 by punctuated lines 48) (sliding along pins or studs) (indicated by dotted circumference 49 on Fig. 5) (introduced into the body of either lower or upper casing.

The section through KL, Fig. 5, is shown on Fig. 6 in its lower left-hand side quadrant illustrating construction of a scraping ring 50; as all quadrants present exact counter-parts of each other, only one is depicted. The scraping ring 50 is provided with a series of hooks 51 fastened to an annular spring 52 by some means such as pins. The annular spring 52 is in its turn fastened to brackets 53 projecting from the body of the lower casing 40.

The ball caster illustrated by Figs. 5 & 6 may have any of the scraping rings of the types described in connection with Figs. 1 & 3 if the motion of the lower casing in the direction of the axis of its rotation is small) (let us say, five-, or ten- thousandth of an inch) (for the purpose of locking the rolling ball.

As is the case with the ball caster illustrated by Fig. 1, the scraping ring of ball caster shown on Figs. 5 & 6 may, as a separate part, be eliminated, and the lower casing so modified as to form a scraper along its lower edge. The construction of such a scraper, indicated by dotted lines 54 on Fig. 5, is similar to that indicated by reference characters 17, 26, & 24 on Fig. 1 and described above; the figure 54 of Fig. 5 corresponds to 17 of Fig. 1.

Fig. 7 illustrates a simplified construction of this invention. This is a modification of the ball caster depicted by Fig. 3. The arrangement of balls 1 & 27 of Fig. 7 is on similar lines with that of Fig. 3. The whole casing 56, Fig. 7, is formed into one inseparable unit, and its part below the line MN is closed around a rolling ball 1 by some means such as rolling and compressing, after the rolling ball 1 and bearing balls 27, Fig. 7, are placed into their respective positions in the casing. The casing may also be provided with straight or spiral slits 62. The part of casing which envelops the rolling ball 1, but does not touch it above the plane MN, is of more or less spherical shape and has a number of nest-like seats 29 similar to those described above in connection with Fig. 3. The upper part of the casing is turned out to form a flat surface 57, or it is shaped in cylindrical or prismatic form 58 and, in either cases, provided with some means of attachment such as screw holes. The casing of ball caster illustrated by Fig. 7 may be made in two parts connected together approximately along the line MN by any conventional means such as screw threads for instance. In the case of screw-thread connection, the parts provided with screw threads would naturally be of cylindrical instead of spherical shape shown by bends in the line MN on the drawing.

910 128 070

the demarcation of part 59 is indicated. The part 59 may be so modified as to be a scraping device described above, such as a scraping ring described in connection with Fig. 1 and referred to by characters 16, 14, & 4; or any of two devices illustrated by Figs. 3 and 4; one, under reference characters 35, 36, & 37; and the other, under 38 & 39. Also, the part 59, Fig. 7, may be constructed on the lines similar to those described in connection with the lower casing of Fig. 5 & 6 thereby providing a locking device for this type of ball casters; in that case the reference character 55, Fig. 7, would indicate an approximate position of one of at least two slots corresponding to the one described with reference to Fig. 5 and indicated on it by 48; the part 59 then will have to be provided with lugs or ears of any shape as is suggested by dotted line 61.

Having now fully described and ascertained my said invention and the manner in which it is to be performed, I declare that what I claim is:-

1. A ball caster, or the like comprising essentially a ball, designated as "rolling ball", adapted to roll in any direction on a surface of support such as a floor, or the like; a plurality of balls, smaller than the said rolling ball and hereinafter referred to as bearing balls, distributed on the surface of the said rolling ball; and a casing adapted to envelop the said rolling ball, barring a portion of it, and the said bearing balls holding the former and the latter so as to permit them to rotate freely around their centres while maintaining the correlative positions of their centres with respect to each other and to the body of the caster.
2. In a ball caster, or the like as claimed in claim 1, the employment of means for prevention of dirt penetrating into the interior of the caster.
3. In a ball caster, or the like as claimed in claim 1, the employment of a locking device preventing at will a rotation of the rolling ball in the casing.
4. In a ball caster, or the like as claimed in claim 2, the employment of a locking device or brake preventing at will a rotation of the rolling ball in the casing.
5. A ball caster, or the like constructed and arranged substantially as herein described and as illustrated by Figs. 1 & 2 of the accompanying drawing.
6. A ball caster, or the like constructed and arranged substantially as herein described and as illustrated by the halves of Figs. 3 & 4 to the left of plane EF on the accompanying drawing.
7. A ball caster, or the like constructed and arranged substantially as herein described and as illustrated by the halves of Figs. 3 & 4 to the right of plane EF on the accompanying drawing.
8. A ball caster, or the like constructed and arranged substantially as herein described and as illustrated by Figs. 5 & 6 of the accompanying drawing.

9. A ball caster, or the like constructed and arranged substantially as herein described and as illustrated by Fig. 7 of the accompanying drawing.

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